

**FAULT DETECTION AND DIAGNOSTICS FOR PACKAGED DIRECT EXPANSION UNITS**

CEC-NRCA-MCH-12-A (Revised 01/19)

CALIFORNIA ENERGY COMMISSION



<b>CERTIFICATE OF ACCEPTANCE</b>		<b>NRCA-MCH-12-A</b>
<b>Fault Detection and Diagnostics (FDD) for Packaged Direct Expansion Units</b>		<b>(Page 1 of 3)</b>
Project Name:	Enforcement Agency:	Permit Number:
Project Address:	City:	Zip Code:
System Name or Identification/Tag:	System Location or Area Served:	

<b>Compliance Results:</b> AUTOMATED ("Complies" or Does Not Comply")	Enforcement Agency Use: Checked by/Date
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<b>Intent:</b>	Submit one Certificate of Acceptance for each system that must demonstrate compliance. ( <a href="#">NA7.5.11</a> , <a href="#">§120.2(i)</a> ) This acceptance test is recommended to be performed simultaneity with <a href="#">NRCA-MCH-02-A</a> (Outside Air) and <a href="#">NRCA-MCH-05-A</a> (Air Economizer Controls).
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<b>A. Construction Inspection</b>			
Building:	Floor:	Room/Area/Zone:	Control/System:
<b>1</b>	Required Documentation (check <b>all</b> of the following):		
<input type="checkbox"/>	a.	<a href="#">NRCC-MCH-03-A</a> , designs, specification sheets, and schedules as approved by the authority having jurisdiction.	
<input type="checkbox"/>	b.	<a href="#">NRCA-MCH-02-A</a> (Outside Air) and <a href="#">NRCA-MCH-05-A</a> (Air Economizer controls); recommended to be completed simultaneity.	
<b>2</b>	Prior to functional testing (check <b>all</b> of the following):		
<input type="checkbox"/>	a.	Verify that the Fault Detection and Diagnostics (FDD) hardware is installed on the unit. ( <a href="#">NA7.5.11.1(a)</a> )	
<input type="checkbox"/>	b.	Verify the FDD system matches the make and model reported on the design drawings. ( <a href="#">NA7.5.11.1(b)</a> )	
<b>3</b>	<b>IF</b> the manufacturer <b>HAS</b> certified the FDD to the Energy Commission (check the following): ( <a href="#">§120.2(i)8</a> )		
<input type="checkbox"/>	a.	Verify that the FDD is currently listed with the Energy Commission approved list: ( <a href="#">NA7.5.11.1(c)</a> , <a href="#">(d)</a> , and <a href="#">(e)</a> , <a href="#">§120.2(i)8</a> , <a href="#">JA6.3</a> ) <a href="http://www.energy.ca.gov/title24/equipment_cert/fdd/index.html">http://www.energy.ca.gov/title24/equipment_cert/fdd/index.html</a>	
<b>4</b>	<b>IF</b> the manufacturer <b>HAS NOT</b> certified the FDD to the Energy Commission, reference the Required Documentation 1a. and 1b (check <b>all</b> the following): ( <a href="#">Exception to §120.2(i)8</a> )		
<input type="checkbox"/>	a.	Verify that the following temperature sensors are permanently installed: outside air, supply air, and when required for differential economizer operation, a return air sensor. ( <a href="#">NA7.5.12.1(a)</a> , <a href="#">§120.2(i)1</a> )	
<input type="checkbox"/>	b.	Verify that the temperature sensor have an accuracy of ±2°F over the range of 40°F to 80°F. ( <a href="#">NA7.5.12.1(a)</a> , <a href="#">§120.2(i)2</a> )	
<input type="checkbox"/>	c.	Verify that the controller has the capability of displaying the value of each sensor. ( <a href="#">§120.2(i)3</a> )	
<input type="checkbox"/>	d.	Verify that the controller provides a system status by indicating the following conditions: ( <a href="#">§120.2(i)4</a> ) <ul style="list-style-type: none"> <li>Free cooling available;</li> <li>Economizer enabled;</li> <li>Compressor enabled;</li> <li>Heating enabled, if the system is capable of heating; and</li> <li>Mixed air low limit cycle active.</li> </ul>	
<input type="checkbox"/>	e.	Verify that the unit controller allows manual initiation of each operating mode so that the operation of cooling systems, economizers, fans, and heating systems can be independently tested and verified. ( <a href="#">§120.2(i)5</a> )	
<input type="checkbox"/>	f.	Verify that the faults are reported in one of the following ways: ( <a href="#">§120.2(i)6</a> ) <ul style="list-style-type: none"> <li>Reported to an Energy Management Control System regularly monitored by facility personnel.</li> <li>Annunciated locally on one or more zone thermostats, or a device within five (5) feet of zone thermostat(s), clearly visible, at eye level, and meeting the following requirements: <ul style="list-style-type: none"> <li>On the thermostat, device, or an adjacent written sign, display instructions to contact appropriate building personnel or an HVAC technician; and</li> <li>In buildings with multiple tenants, the annunciation shall either be within property management offices or in a common space accessible by the property or building manager.</li> </ul> </li> <li>Reported to a fault management application which automatically provides notification of the fault to remote HVAC service provider.</li> </ul>	
Construction Inspection Compliance Results: AUTOMATED ("Complies" or Does Not Comply")			

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<b>Fault Detection and Diagnostics (FDD) for Packaged Direct Expansion Units</b>		<b>(Page 2 of 3)</b>
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B. Functional Testing		
Steps:	For each HVAC unit to be tested, complete the following: ( <a href="#">NA7.5.11.2</a> )	Results
1	Air Temperature Sensor failure/fault: ( <a href="#">NA7.5.11.2.1</a> , <a href="#">§120.2(i)7A</a> )	
a.	Verify the FDD system indicates normal operation. ( <a href="#">NA7.5.11.2.1 Step 1</a> )	P/F
b.	Disconnect outside air temperature sensor from unit controller. Verify that the FDD system reports a fault. ( <a href="#">NA7.5.11.2.1 Step 2a</a> )	P/F
c.	Connect outside air temperature sensor to unit controller. Verify that the FDD system indicates normal operation. ( <a href="#">NA7.5.11.2.1 Step 3b</a> )	P/F
2	Excess Outside Air Sensor failure/fault: <b>Coordinate this test with NRCA-MCH-02-A (Outdoor Air)</b> ( <a href="#">NA7.5.11.2.2</a> , <a href="#">§120.2(i)7B</a> )	
a.	IF <a href="#">NRCA-MCH-02-A</a> indicates "pass" THEN verify that the FDD system indicates normal operation. ( <a href="#">NA7.5.11.2.2 Step 1a</a> )	P/F
3	Economizer Operation Sensor failure/fault: <b>Coordinate this test with NRCA-MCH-05-A (Air Economizer Controls)</b> ( <a href="#">NA7.5.11.2.3</a> , <a href="#">§120.2(i)7C</a> )	
a.	Simulate failure by immobilizing the outdoor air economizer damper according to the manufacturer's instructions. Verify that the FDD system reports a fault. ( <a href="#">NA7.5.11.2.3 Step 1a</a> )	P/F
b.	Successfully complete and pass NRCA-MCH-05-A and verify that the FDD system report normal operation. ( <a href="#">NA7.5.11.2.2 Step 2b</a> )	P/F
Functional Testing Compliance Results: AUTOMATED ("Complies" or Does Not Comply")		

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<b>DOCUMENTATION AUTHOR'S DECLARATION STATEMENT</b>		
1. I certify that this Certificate of Acceptance documentation is accurate and complete.		
Documentation Author Name:	Documentation Author Signature:	
Documentation Author Company Name:	Date Signed:	
Address:	ATT Certification Identification (If applicable):	
City/State/Zip:	Phone:	
<b>FIELD TECHNICIAN'S DECLARATION STATEMENT</b>		
I certify the following under penalty of perjury, under the laws of the State of California:		
<ol style="list-style-type: none"> <li>1. The information provided on this Certificate of Acceptance is true and correct.</li> <li>2. I am the person who performed the acceptance verification reported on this Certificate of Acceptance (Field Technician).</li> <li>3. The construction or installation identified on this Certificate of Acceptance complies with the applicable acceptance requirements indicated in the plans and specifications approved by the enforcement agency, and conforms to the applicable acceptance requirements and procedures specified in Reference Nonresidential Appendix NA7.</li> <li>4. I have confirmed that the Certificate(s) of Installation for the construction or installation identified on this Certificate of Acceptance has been completed and signed by the responsible builder/installer and has been posted or made available with the building permit(s) issued for the building.</li> </ol>		
Field Technician Name:	Field Technician Signature:	
Field Technician Company Name:	Position with Company (Title):	
Address:	ATT Certification Identification (if applicable):	
City/State/Zip:	Phone:	Date Signed:
<b>RESPONSIBLE PERSON'S DECLARATION STATEMENT</b>		
I certify the following under penalty of perjury, under the laws of the State of California:		
<ol style="list-style-type: none"> <li>1. I am the Field Technician, or the Field Technician is acting on my behalf as my employee or my agent and I have reviewed the information provided on this Certificate of Acceptance.</li> <li>2. I am eligible under Division 3 of the Business and Professions Code in the applicable classification to accept responsibility for the system design, construction or installation of features, materials, components, or manufactured devices for the scope of work identified on this Certificate of Acceptance and attest to the declarations in this statement (responsible acceptance person).</li> <li>3. The information provided on this Certificate of Acceptance substantiates that the construction or installation identified on this Certificate of Acceptance complies with the acceptance requirements indicated in the plans and specifications approved by the enforcement agency, and conforms to the applicable acceptance requirements and procedures specified in Reference Nonresidential Appendix NA7.</li> <li>4. I have confirmed that the Certificate(s) of Installation for the construction or installation identified on this Certificate of Acceptance has been completed and is posted or made available with the building permit(s) issued for the building.</li> <li>5. I will ensure that a completed, signed copy of this Certificate of Acceptance shall be posted, or made available with the building permit(s) issued for the building, and made available to the enforcement agency for all applicable inspections. I understand that a signed copy of this Certificate of Acceptance is required to be included with the documentation the builder provides to the building owner at occupancy.</li> </ol>		
Responsible Acceptance Person Name:	Responsible Acceptance Person Signature:	
Responsible Acceptance Person Company Name:	Position with Company (Title):	
Address:	CSLB License:	
City/State/Zip:	Phone:	Date Signed: